TROPICAL DISEASES BUREAU.

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DISEASES DUE TO PROTOZOAN PARASITES.

VAN DER ELST (O.). **Sur la transmission mécanique de la trypanosomiase.** [The Mechanical Transmission of Trypanosomiasis.]—*Bull. Méd. du Katanga.* 1924. Aug. Vol. 1. No. 4. pp. 130–132.

The author records two outbreaks of trypanosomiasis, one among cattle and the other among pigs, in which the evidence appeared to indicate mechanical transmission. There was complete absence of Glossina and the outbreaks occurred during the season when Stomoxys and Tabanidae were numerous. Among the pigs abortion occurred. The deaths amounted to 30 per cent. Orpiment, atoxyl, and emetic alone or in conjunction failed to effect any cures, and, in fact, appeared to hasten death in many instances.

Seven bovines were found infected on the premises. These were slaughtered. In the pigs the parasite appeared to be *T. rodhain.*

WALRAVENS (P.). **La trypanosomiase chez le porc due au** *Tryp. rodhain* **(n. sp.)** [Trypanosomiasis in the Pig due to *T. rodhain* n.sp.]—*Bull. Méd. du Katanga.* 1924. Aug. Vol. 1. No. 4. pp. 132–133.

The trypanosome was found in pigs on the same premises as were visited by ELST.

In moist preparations the parasite executes wriggling movements, which do not involve much translation.

In stained preparations the parasite presents a long, very slender body, a central nucleus, a blepharoplast which is close to the margin of the body and quite close to the posterior end. The undulating membrane is poorly developed. There is always a long free flagellum. The parasite is invariably monomorphic. No measurements are given.

CURSON (H. H.). **The Causal Organisms of Nagana.**—MS. of a Note Communicated to the South African Association for the Advancement of Science at Capetown, July 1924.

"Nagana" is the Zulu name for a disease in domesticated animals (chiefly bovines) characterized by emaciation, progressive weakness, and terminating generally in death.

In 1894 BRUCE detected parasites, later designated *T. brucei* by PLIMMER and BRADFORD, "in the blood of certain animals." In

1909 THEILER showed that *T. congolense* occurred in Zululand, and was responsible for a disease similar to that caused by *T. brucei*. Nagana should therefore not be applied solely to the condition caused by *T. brucei*. *T. congolense* is far more important economically in cattle than *T. brucei*, the condition set up by the latter being, comparatively speaking, mild. In 1921 Curson showed that *T. vivax* also occurs in Zululand, and is responsible for a condition closely resembling Nagana. This parasite has as yet been found in cattle only.

Nagana should be used as the term indicating the group of trypanosome infections, the symptoms of which are practically common.

VAN SACEGHEM (René). **Note préliminaire sur l'action du Bismoxyl dans les trypanosomiases.** [Preliminary Note on the Action of Bismoxyl in Trypanosomiasis.]—*C. R. Soc. Biol.* 1924. Oct. 24. Vol. 91. No. 29. pp. 914–917.

The author has prepared bismoxyl by mixing in equal quantities a 1 per cent. solution of bismuth tartrate and an extract of ox liver. The latter was prepared by mixing one volume of liver pulp with two volumes of salt solution. The mixture is incubated at 37° C., and bismoxyl is precipitated.

Experiments in the treatment of trypanosomiasis have been carried out with the moist precipitate and with the drug in dry powder form. Two experiments were made with the drug in the former condition. The first animal, a cow infected with *T. congolense*, was given intravenously the precipitate obtained from 350 cc. of liver extract and 350 cc. of bismuth tartrate solution. The precipitate was washed several times and then injected in 700 cc. of normal salt solution.

As this failed to remove trypanosomes from the circulation, a second larger dose was given (precipitate from 450 cc. of each component in 850 cc.). The animal died, apparently from anaphylactic shock, during the injection. The second animal received the injection subcutaneously. Trypanosomes were not cleared from the circulation.

With the dry powder three animals were treated. The doses used were 7 to 9 grammes in the first instance. One animal also received a dose of 40 g. All the injections were given subcutaneously. In no case were trypanosomes cleared from the circulation.

VAN SACEGHEM (René). **Action de l'hexaméthylène-tétramine (Urotropine) dans les trypanosomiases animales.** [Urotropin in the Treatment of Trypanosomiasis.]—*C. R. Soc. Biol.* 1924. Oct. 24. Vol. 91. No. 29. pp. 917–918.

Urotropin in a 40 per cent. solution has been used for the treatment of animals affected with *T. congolense* and *T. cazalboui* var. *vivax*, by intravenous injection.

Doses of 8 to 16 g. of the drug were used, and two or three doses were given. They were without effect upon the trypanosomes in the circulation.

VAN HOOF (L.). **Action du "Bayer 205" sur les trypanosomiases animales. (Note complémentaire.)**—*Ann. Soc. Belge. Méd. Trop.* 1924. Nov. Vol. 4. No. 2. pp. 255–256.

A trypanosome infection was found among some Dahomey cattle near Leopoldville. The parasite was dimorphic. "Some showed a

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very short free flagellum, and others were stumpy without free flagellum." The author believes that the parasite was *T. dimorphon* Laveran and Mesnil. The first passages through the guineapig produced a moderately severe infection. The period of incubation was about three weeks, and the period of infection was at the most a fortnight. From the third passage the disease became far more severe. the period of incubation was reduced to 4 days and that of illness to 4 to 8 days.

The parasite was pathogenic for the goat (incubation 7 days, illness 15 days), and monkey (incubation 6 days, illness 18 days). A dose of 0·5 g. of tryparosan per kilo. caused the disappearance of the trypanosome in the monkey in 48 hours. The strain has been kept at the School of Tropical Medicine in Brussels, where the virulence has gradually become attenuated.

The parasite is not affected by Bayer 205 [no details are given].

SCHMIDT (Fritz). **Virulenzänderung des *Trypanosoma equinum* nach Behandlung mit "Bayer 205."** [Alteration of Virulence of *T. equinum* after Treatment with "Bayer 205."]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Sept. Vol. 28. No. 9. pp. 397–403.

In the author's first experiments dogs were infected with Mal de Caderas and were treated per os with "205." Doses of 0·3 g. were given up to a total amount of 2·5 to 3 g. The effect was to clear the circulation for about 10 days. The parasites did not appear to have been "fast" to the drug by this treatment, for a single injection of 0·5 g. effected a complete cure.

Blood was taken from one of these dogs at the first appearance of trypanosomes after treatment per os, and was injected into a mule which had already been cured of an experimental infection with Caderas. Trypanosomes appeared on the 26th day. An intravenous injection of 0·5 g. of "205" was given, and for 42 days the circulation was free from parasites. A second injection was given, and a complete cure was effected.

Subsequent experiments performed with blood derived from animals which had been treated with "205" failed to yield any evidence that the trypanosomes acquire any degree of "fastness" to the drug.

LUENGO (E.) & DE BUEN (S.). **Pouvoir trypanolytique du sérum d'un malade traité par le "Bayer 205."**—*C. R. Soc. Biol.* 1924. Oct. 7. Vol. 91. No. 28. pp. 825–827.

Three experiments were carried out with the object of ascertaining whether the serum of a patient treated with "205" possessed any protective powers, and whether these were due directly to the drug itself or not.

The authors have been able to come to the provisional conclusion that the trypanocidal action is not due solely to the drug itself, but in part to properties developed by the serum, in part, perhaps, due to the destruction of the trypanosomes. The trypanocidal power of the serum appears to be variable with a certain periodicity.

If there is any immunity produced, as has been suspected, the object of treatment with "Bayer 205" should be the progressive destruction of trypanosomes rather than complete sterilization by the chemical direct.

KUDICKE (R.), STRAUSS (Ed.) & COLLIER (W. A.). **Versuche zur Gewinnung von trypanoziden Substanzen durch Hydrolyse von Eiweisskörpern.** [Attempts to obtain Trypanocidal Substances by the Hydrolysis of Albumens.]—*Zeitschr. f. Hyg. u. Infektions-Krankh.* 1924. Sept. Vol. 103. No. 3. pp. 622–639.

In the mixture of albumoses and peptones which results from hydrolysis of albumens there are substances which are capable of destroying trypanosomes *in vitro*. It is possible that products of further breaking down of protein may act in a similar way. The possibility suggests itself that similar substances are produced in the animal body and assist in the combat against the parasites.

QUIROGA (S. S.). **La prueba de fijacion del complemento en el diagnóstico del "Mal de Caderas."** [The Complement Fixation Test in the Diagnosis of Mal de Caderas.]—*Revist. Zootecnica.* 1924. July 15. Vol. 10. No. 130. pp. 195–203.

The author's conclusion is that the complement fixation test cannot replace existing methods of diagnosis.

KNOWLES (R.), NAPIER (L. E.), & SMITH (R. O. A.). **On a Herpetomonas found in the Gut of the Sandfly,** *Phlebotomus argentipes*, **fed on Kala-azar Patients.**—*Indian Med. Gaz.* 1924. Dec. Vol. 59. No. 12. pp. 593–597.

In ten out of eleven consecutive experiments female laboratory-bred *P. argentipes*, fed upon parasite-containing blood of Kala-azar patients, showed typical herpetomonad forms in the fore-gut and mid-gut at the third to the fifth day after the feed. No less than 25 out of 56 such fed flies showed herpetomonads, and in six instances the infection was a heavy one, although the patients' blood films showed only scanty *L. donovani* present.

2. On dissection and examination of 811 control sandflies, including both *P. minutus* and *P. argentipes*, the only natural infections encountered have been once a Rickettsia, three times a Bodo, and once a doubtful Spirochaete. Nothing resembling a Herpetomonad has been encountered.

3. On dissection and examination of 46 other control female *P. argentipes* fed upon persons not suffering from Kala-azar no protozoa were found.

4. It is concluded that *L. donovani* passes into its flagellate form in the gut of *P. argentipes* under suitable conditions of temperature and humidity. Any further conclusions with regard to the Kala-azar transmission problem, however, are at present carefully avoided.

AVARI (C. R.) & MACKIE (F. P.). **Canine Leishmaniasis in Bombay.**—*Indian Med. Gaz.* 1924. Dec. Vol. 59. No. 12. pp. 604–605. With 1 text fig.

A pariah dog was found having a superficial sore near the base of the ear. Films were made and leishmania-like parasites were found in fair numbers. A week later the sore was found to be healed and there remained a small nodule covered with a scab.

This was excised, broken up and rubbed into scarifications on a dog and a monkey. The result of this is not recorded.

Bombay is not an indigenous centre of human kala-azar, while Assam, Bengal and Madras are highly endemic areas. This is apparently the first case of canine leishmaniasis recorded from India. The facts appear to suggest that there is no connection between the canine and human diseases.

SERGENT (Et.), GUEIDON (E.), BOUGUET (A.), & CATANEI (A.). **Existence de la leishmaniose cutanée chez le chien dans une localité du Tell algérien où le bouton d'Orient est endémique chez l'homme.** [The Occurrence of Cutaneous Leishmaniasis in Dogs in a District in which Oriental Sore occurs in Man.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 360–361.

Leishmania have been found to be present in large numbers in ulcers on a dog at a village in the Constantiné Department, where several cases of oriental sore have been recorded recently.

The dog was in good general condition. Below the right nostril there was a crater-like ulcer about 4 mm. in diameter. On the inner surface of the ears there were found scabs covering ulcers varying from 3–5 mm. in diameter. The scabs were thick and of a greyish yellow colour. Leishmania were found in exudate from these lesions.

Those found in the nasal lesion were round or oval, but many of those found in the lesions of the ear were fusiform. The parasites from the ears were smaller than those from the nose.

The parasite recorded by YAKIMOFF as occurring in cutaneous leishmaniasis in dogs in Turkestan were more than twice as large (7.8μ) as those found in Constantiné.

ADELHEIM (R.). **Über Leishmaniosis infantum et canina in Riga.** [Infantile and Canine Leishmaniasis in Riga.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Sept. Vol. 28. No. 9. pp. 367–387.

The author records a case of leishmaniasis in a five-year-old girl at Riga. The family had been in Tashkent about three months previously and the child had been ill about four months. Blood preparation showed no malarial parasites, and the clinical picture of the case did not indicate malaria as the cause of the illness. Spleen puncture was resorted to, and Leishmania were found in large numbers.

No benefit accrued from any treatment until tartar emetic was given intravenously.

In the course of an inquiry as to possible means by which the girl became infected, it was ascertained that the family possessed a dog which had been brought to Riga with them. The animal, in spite of care and attention, was thin and ill. A blood smear was made, but no parasites were discovered. The dog was killed, and it was found to be affected with generalized leishmaniasis. There appears to be no doubt that the girl was infected either directly or indirectly from the dog.

An attempt was made to obtain cultures on slanting agar which had been smeared over the surface with rabbit blood, but no success was achieved. Mice, guineapigs, and rabbits were inoculated subcutaneously. No evidence of infection was found in the last two,

but the mice became infected, and some of them died in about 6 months. Others appeared to recover from the inoculation.

Evidence was also obtained that healthy mice can contract the infection when kept in close contact with diseased mice.

MÖLLER (Jens). **Kokzidien bei den Säugetieren des Zoologischen Gartens zu Berlin.** [Coccidiosis of Mammals in the Zoological Gardens, Berlin.]—*Inaug. Diss. Doct. Med. Vet. Berlin.* 1923. June 30. 23 pp. [Ex. *Bull. Inst. Pasteur.* 1924. Oct. 31. Vol. 22. No. 20. pp. 801–802.]

Apart from rabbits and goats, few of the animals in the Berlin Zoological Gardens harbour coccidia.

An Eimeria has been found in the squirrel of the Carolines. Oocysts 22–28μ by 14–18μ.

Two lion cubs were parasitized. The oocysts ranged from 36–48μ by 28–34μ. It was an Isospora and possibly identical with *Isospora felis.*

VORBRODT (Karl). **Zur Kenntnis der Schafkokzidiose.** [Coccidiosis of the Sheep.]—*Inaug. Diss. Doct. Med. Vet. Berlin.* 1923. 32 pp. [Ex. *Bull. Inst. Pasteur.* 1924. Oct. 31. Vol. 22. No. 20. pp. 802–803.]

According to the author, the portions of the intestine chiefly invaded are the duodenum and jejunum.

FRENZ (Otto). **Beiträge zur Kenntnis der Schweinekokzidiose.** [Coccidiosis of the Pig.]—*Inaug. Diss. Doct. Med. Vet. Berlin* (no date). 14 pp. [Ex. *Bull. Inst. Pasteur.* 1924. Oct. Vol. 22. No. 20. p. 805.]

The author believes that 75 per cent. of German pigs are infected with coccidia. The parasite is not responsible for serious illness save in young pigs. The parasite invades the jejunum and ileum. The oocysts measure 24–36μ by 18–26μ. Two species could not be distinguished.

LELAU (U.) & VITTORIO (A.). **Nuovo Coccidio nel cavallo** (*Eimeria Utinensis*). [A New Coccidium of the Horse. *Eimeria utinensis.*]—*La Clin. Veterinara.* 1924. Oct. Vol. 47. No. 10. pp. 587–592.

The parasite is described as having been detected in a fifteen-year-old horse which was brought to the abattoirs for slaughter on account of paralysis and general wasting. Ill-defined nodular lesions were present in the lungs, particularly in the apical lobes. The bronchi contained clots which incompletely filled the lumen, some white and some red.

The liver contained a few small nodules. These had calcified fibrous capsules and caseous contents.

Coccidia were found in material taken from the lesions in the lungs, bronchi, bronchial mucosa, and liver.

The authors give rough sketches of the parasites and interpret these as covering the complete cycle of the parasite. The sketches are not very convincing.

TRIFFITT (M. J.). **Note on an *Eimeria* n.sp. found in the Faeces of an Eland.**—*Jl. Trop. Med. & Hyg.* 1924. Aug. 15. Vol. 27. No. 16. pp. 223–225. With 1 plate.

The eland, *Oreas canna*, was imported from Durban into the Zoological Gardens, London.

Oocysts were numerously present in the faeces and measured from 23·5μ to 34μ in length by 16·5μ to 20μ in breadth.

The cyst wall comprised three layers. The outer was a very thin membrane, the middle one double contoured but reduced in thickness at the poles. Internal to this, and slightly separated from it, was a delicate membranous lining. A micropyle was found at one of the flattened poles.

In specimens fixed in Schaudinn the cyst wall became indented at the poles. The contents formed a protoplasmic ball about 15μ in diameter. It was found to be impossible to stain the intact cysts. At room temperature the organism sporulated in the faeces in twelve days. At 70° F. development was completed in five days.

The process of sporulation occurred in the typical way.

Attempts to infect two clean rabbits failed.

The author gives a table of the sizes of the principal species of Eimeria and comes to the conclusion that it is a distinct species. The name *Eimeria canna* is proposed.

CATANEI (A.). **Etude expérimentale de l'association de la spirochétose et du paludisme des oiseaux. Note préliminaire.** [The Experimental Study of the Association of Spirochaetosis and Malaria in Birds.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 535–538.

The author's investigations were undertaken with a view to ascertaining whether the infections when present simultaneously have any influence on each other.

The idea originated from the fact that simultaneous infections in man with the spirochaete of relapsing fever and malarial organisms have been encountered in Algeria on a number of occasions. Canaries have been used because they are susceptible to infection with *S. gallinarum* and *Pl. relictum*. Spirochaetes appear in the blood two days after inoculation, they persist for 3–4 days and then disappear. No symptoms are observed as a rule, and recovery leaves immunity.

The plasmodium infection has a period of incubation of 3 to 10 days. This is followed by an acute phase, which persists for about 9 days. Parasites become very numerous in the blood during this period and there is a mortality of 30 per cent. Parasites then decrease in numbers. Complete recovery does not take place, but the birds appear to be perfectly healthy. They are then immune.

Canaries infected with spirochaetosis during either the period of incubation or during the acute phase of plasmodium infection have developed severe forms of both diseases. Those inoculated with plasmodium on the last day of spirochaetal paroxysm developed an acute attack which followed a normal course.

Nine canaries which were infected with plasmodium were inoculated with spirochaetes at intervals ranging from 1 month to 3 years and 9 months after recovery from the acute infection. In six instances a relapse to plasmodium infection occurred. Ten canaries having plasmodium infection of 1 to 4 months' standing were inoculated with the blood of a canary which was suffering from acute spirochaetosis and chronic plasmodium infection. Nine showed relapses to plasmodium infection. One bird was reinoculated with spirochaetes after the recovery from the relapse and a second relapse occurred which proved fatal.

ADIE (Helen). **The Sporogony of** *Haemoproteus columbae.*—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 605–613. With 5 figs. & 2 plates.

Mrs. Adie draws attention to the fact that her researches in this connection, published in the *Indian Journal of Medical Research* in January 1915, have not been incorporated in some of the text books dealing with this subject. She has had the opportunity of demonstrating in Algerian flies the stages of development of *Haemoproteus columbae* observed in the Indian transmitting flies. Sporozoites reach the salivary glands 10–12 days after the infecting feed. The gametocytes appear in the blood 28 days after the injection of the sporozoites by the flies.

The cycle is therefore similar to that of the proteosoma parasite. It is another instance of the cycle of Ross.

LOGÉ & BIZARD (E.). **Sur 4 cas de piroplasmose équine** (*Piroplasma caballi*) **observés dans le département de la Loire-Inférieure.** [Four Cases of Equine Piroplasmosis (*Piroplasma caballi*) in the Department of Loire-Inférieure.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 347–354.

Case 1. An eighteen-year-old mare which came into close contact with American horses during the war was found to have parasites in its blood. Oval, ring, pear-shaped and twin forms were found. The number of infected corpuscles was about 1 per cent.

This animal was treated with novarsenobenzol. Parasites were present in the blood for three days after treatment, and death occurred on the fourth day.

At the post-mortem the principal lesions were enlargement of the spleen (6 kg.), enlargement of the liver (11 kg.), congestion of the intestines, pale pink pleural exudate, congestion of the lungs and kidneys.

Case 2. A four-year-old mare. Examination of this animal's blood showed that the parasites were far more scantily present than in the preceding case. The case was first seen when illness had been in existence for four days. An intramuscular injection of trypanblue was given. Two days later an injection of cacodylate of soda was given. Improvement set in and recovery took place.

Case 3. A six-year-old mare born at Limousinière and bought at Nantes in March, 1924. The animal was taken ill 15 days after arrival at Montoir. During this period it was grazed with two apparently

perfectly healthy horses in a pasture which had not had a horse upon it for ten years.

Parasites were found to be scantily present in the blood. An injection of novarsenobenzol was given. Recovery took place.

Case 4. Seven-year-old mare. This animal had been ill for about a week, and had been treated by a quack. When first seen the animal was down and could rise with difficulty only. There was marked jaundice, and the temperature was 40·4° C.

An intravenous injection of 5 g. of trypanblue was given. The following day there was considerable improvement in the animal's condition. Parasites were found to be scantily present in the blood. There was no haemoglobin in the urine, but a considerable amount of albumen.

All the animals presented the same clinical symptoms: fever, jaundice, dullness, uncertainty of gait. Ticks, *Dermacentor reticulatus*, were found on all of them. In no case was haemoglobinuria observed.

DONATIEN (A.), LESTOQUARD (F.), & SAUSSEAU (L.). **Piroplasmes et Jaunisse des Muletons du Poitou.** [Piroplasms and Jaundice in Mules in Poitou.]—*Rev. Vét.* 1924. Sept. Vol. 76. No. 9 pp. 529–531.

An account of this parasite has appeared elsewhere and has been abstracted in this *Bulletin*.

ANDERSON (Ch.). **Note concernant la Toxoplasmose du Gondi.** [Toxoplasmosis of the Gondi.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 354–355.

The author found toxoplasmosis in two gondis which died 29 and 34 days respectively after capture.

In connection with the possible transmission of the infection by ectoparasites the author records that he found *Dermanyssus gallinae* and *Laelaps stabularis*.

GALLEGO (A.). **Contribucion al estudio de las lesiones del higado en la tiflohepatitis de los pavos.** [The Lesions of the Liver in "Blackhead."]—*Revist. Hyg. y. Sanidad Pecuarias.* 1924. Sept. Vol. 14. No. 9. pp. 555–560.

The author describes the lesions found in a turkey. They did not differ in appearance from those described by other authors. In sections from apparently normal portions of the liver a perivascular infiltration was found, and in the lesions themselves there were areas of amyloid degeneration.

POPOFF (P.). **An Attempt at growing Pathogenic Protozoa by the Method of Collodion Sacks.**—*Jl. Trop. Med. & Hyg.* 1924. Sept. 15. Vol. 27. No. 18. pp. 247–248.

The author proposes a method of cultivating protozoa which is free from the objections of the method devised by BASS for malarial parasites. The objections which he raises to Bass's method are: (1) That the toxins remain in contact with the organisms; (2) that

in the natural condition the blood is always moving; and (3) that cultures are exposed to light.

He claims that he has overcome these difficulties as follows:—

The defibrinated blood containing malarial parasites has added to it 50 per cent. glucose. This blood is placed in collodion sacs, which are immersed in tubes of normal saline, Ringer's or Locke's Solution, and incubated at 37° to 41°. He states that he has used the method for malarial parasites of man, birds, and tortoises, and also for the parasite of a disease which he terms blackwater fever of cows. Dextrose is added every four hours, and the salt solution changed every four hours. No details are given of the results obtained, and the manner of adding the dextrose is not made more clear than is given here.

KŘIVÁČEK (O.). **Spirochätenbefunde beim Hundetyphus.** [Spirochaetes in Dog Typhus.]—*Zeitschr. f. Hyg. u. Infektionskrankh.* 1924. Sept. 20. Vol. 103. No. 3. pp. 529–532.

During an epidemic of Stuttgart disease during the autumn and winter of 1922–23 the author examined the viscera of 21 dogs dead of the disease.

Spirochaetes were demonstrated in 17 cases. The author is not certain that the four cases in which he was unable to find spirochaetes were actually cases of Stuttgart disease.

The most important place to look for the parasite is in the tubules of the kidney. They may be found there within the cells or in the lumen. The author has used LEVADITI'S original method of silver impregnation for the demonstration of the parasite.

They may occur in other organs, but very scantily. In three cases they were found in the deep layers of the wall of the stomach and intestine, and the author does not think that the organisms in these situations were saprophytes which had invaded the damaged wall.

GERLACH (F.). **Geflügelspirochätose in Oesterreich.** [Fowl Spirochaetosis in Austria.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1924 June 16. Vol. 92. Nos. 1-2. pp. 84–96. With 2 plates (one in colour).

The author records the occurrence of this disease in Austria, and gives particulars of the post-mortem appearances and pathological anatomy. He has been unable to find any evidence of developmental forms in the red corpuscles.

COUVY (L.). **Note sur le traitement de la dysenterie amibienne par le stovarsol.** [The Treatment of Amoebic Dysentery by Stovarsol.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 555–556.

ILOWAISKY (N. S.) & BOSCHENKO (W. P.). **Posthume Materialien von S. A. Ilowaisky betr. experimentelle Trypanosomose Su-auru bei verschiedenen Tieren.**—*Rev. Microbiol. et Epidemiol.* Saratov. 1924. Vol 3. No. 3. In Russian pp. 166–181. German summary p. 181.

PHISALIX (M.). **Note complémentaire sur** *Cyclospora viparae*, **coccidie parasite de l'intestin de la Vipère aspic.** [Note on *Cyclospora viparae*, a Coccidium of the Intestine of *Vipera aspis*.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 559–562.

RODENWALDT (Ernst) & DOUWES (J. B.). **Ueber die Anwendung von "Bayer 205" bei der Surra des Pferdes in Niederländisch-Ostindien.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1923. Oct. Vol. 27. No. 9. pp. 305–320. [1 ref.]

DISEASES DUE TO METAZOAN PARASITES.

CAWSTON (F. G.). **The Source of South African Trematodes.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 343–346.

South African trematodes develop most frequently in freshwater snails whose shells are from 15–20 mm. in length, but those species whose shells are only 4 to 6 mm. in diameter are occasional carriers of parasites and must not be overlooked.

General measures to be resorted to for the prevention of Bilharzia infection are :—

1. The introduction of domestic ducks.
2. The use of lime or some larvicide in small collections of water.
3. Drying up small collections of water for at least a week at a time.
4. Where possible, sea-water should be allowed to enter lagoons into which snails are brought by the rivers.
5. The collection and destruction of such species as *Melanoides tuberculata*, which has been found too stout for ducks to eat.

CAWSTON (F. G.). **Occasional Hosts of some South African Trematodes.**—*South African Jl. Sci.* 1923. Dec. Vol. 20. pp. 351–353.

This paper refers to the occasional occurrence of *Schistosomum bovis* in human beings. *Schistosoma mansoni* has been found in *Limnaea natalensis*, *Indora tropica*, and *Physopsis africana*.

Limnaea natalensis is the common host of *Fasciola gigantica* in South Africa, but its cercaria has been recorded in *Physopsis africana* in Natal.

DOLLFUS (R. Ph.). **Qu'est-ce que "*Distoma subflavum* Sonsino"?** [What is "*Distoma subflavum* Sonsino"?]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 572–576. With 1 text fig.

The author thinks it possible that *D. subflavum* Sonsino is identical with *D. allostomum* Diesing 1850.

PAYNE (Florence K.), ACKERT (James E.) & HARTMAN (Ernest). **The Question of the Human and Pig** *Ascaris.*—*Amer. Jl. Hyg.* 1925. Jan. Vol. 5. No. 1. pp. 90–101.

Summary :—

1. The host relationship of the human and pig ascarids was tested by the administration of embryonated ascaris eggs to pigs and primates.

2. Repeated feedings of infective human ascaris eggs were made to five young pigs, all of which suffered respiratory disturbances and

other systemic disorders. Subsequent post-mortem examinations showed no ascarids in the digestive tract of any of the pigs.

3. Infective pig ascaris eggs were taken by one monkey and by two human subjects. Faecal examinations made throughout periods of several months after the initial administration of the eggs failed to show the presence of any ascaris eggs.

4. The incidence of ascaris in north, central, and southern Trinidad, British West Indies, varied from 20 to 70 per cent. for the human ascaris and from 3·5 to 10·8 per cent. for the pig ascaris. In the vicinity of Arouca, one of the principal swine-raising regions, the incidence of human ascaris was 64·3 per cent., as compared with 10·8 per cent. for the pig ascaris.

5. The experimental results indicated that embryonated eggs of the human ascaris will not produce mature ascarids in pigs, that infective eggs of the pig ascarids will not produce mature ascarids in the adult primates, monkey and man, and that there is thus a physiological difference between the human and pig ascaris.

GOODEY (T.). **A Critical Review of Zebrowski's Preliminary Report on Hog Lung-Worms.**—*Jl. Helminth.* 1924. Sept. Vol. 2. No. 4. pp. 198–202.

Goodey's attention was drawn to ZEBROWSKI'S observations published in the proceedings of the Indiana Academy of Science for 1921, by a reference made to them in *Veterinary Medicine* for March, 1924, by HALL. Goodey has consulted the original publication and finds that it is of little value.

GOODEY (T.). **Observations on** *Hyostrongylus rubidus* **(Hassall and Stiles 1892) Hall 1921, from the Stomach of the Pig, with a Note on** *Strongylus attenuatus* **(Molin 1860).**—*Jl. Helminth.* 1924. Sept. Vol. 2. No. 4. pp. 191–197. With 9 figs.

The author has detected this parasite in the stomachs of pigs in England, previous records of its occurrence in this country having been published by BLACKWELL and PILLERS. Goodey elaborates the description of certain anatomical features not previously described in full, and gives an account of the rhabditiform and of the ensheathed infective larvae.

BLANCHARD (M.) & LAIGRET (J.). **Recherches sur la transmission d'***Onchocerca volvulus* **par divers parasites hématophages.** [The Transmission of *Onchocerca volvulus* by Various Blood Sucking Parasites.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 409–417.

Microfilariae ingested by bugs were found to be digested rapidly. Those ingested by *Ornithodorus moubata* were found to be alive and motile for several days after the feed, in one case up to the 12th day. No development of the embryos was found to occur in the ticks, and the embryos withdrawn from infected human beings by the ticks were found to be incapable of penetrating shaved skin of the guineapig.

Ticks removed while feeding on an infected man and placed on a guineapig did not regurgitate any of the larvae ingested.

It is not claimed that any solution to the problem of transmission has been provided.

ILIESCO (G. M.). **Hémorragies multiples cutanées, sous-coutanées et intra-musculaires chez le cheval, produites par une infestation en masse de la Filaire hémorragique.** [Multiple Cutaneous, Subcutaneous, and Intramuscular Haemorrhages in a Horse caused by *Filaria haemorrhagica*.]— *Arch. Veterinara.* 1923. Vol. 17. No. 6. pp. 116–119. With 1 text-fig.

The horse was nine years old and in a state of advanced debility. Haemorrhagic lesions were present over the whole of its body and were so close to each other that the animal had the appearance of being covered with a continuous wound. The owner said the animal had been in his possession three years and no haemorrhagic wounds had been seen on it until about two months before the animal came under observation. It was kept for about a month, during which time, in spite of a liberal diet, wasting continued.

On post-mortem examination no lesions of the internal organs were found. Throughout the subcutaneous tissue, and in the superficial muscles, haemorrhagic centres were found. The skin was thickened round each of the lesions.

The lesions in the superficial layers of the muscles showed dark red centres, and slightly indurated margins. Their average size was that of a nut. Careful examination of divided lesions revealed the presence of worms in them. In some cases only one worm was found. In other lesions worms up to 6 in number were detected. Both males and females were found, and the parasite was identified by CIUREA as *F. haemorrhagica* Railliet 1885.

The author states that CIUREA detected cervical papillae which were provided with a small chitinous point which was directed backwards. This has not been described before. The male parasites measured 26–27 mm. and the females 50–57 mm.

THORNTON (H.). **A Review of the Oesophagostomes in the Collection of the Liverpool School of Tropical Medicine.**— *Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 393–408.

O. columbianium, O. venulosum, O. radiatum, O. dentatum, O. eurycephalum, O. mwanzae, O. simpsoni, O. oldi, are dealt with, and in the case of some of the more recently described parasites the descriptions are amended.

A new species, from the caecum and colon of *Phaecocaerus aethiopicus*, *O. yorkei*, is described. *Oesophagostomum ventri* from the stomach of a Brazilian wild cat is also described.

HANSON (KARL B.) & VAN VOLKENBERG (H. L.). **Anthelmintic Efficiency of Carbon Tetrachlorid in the Treatment of Foxes.**— *Jl. Agric. Research.* 1924. Apr. 26. Vol. 28. No. 4. pp. 331–337.

The chemically pure drug was administered either in hard gelatin capsules or in soft elastic globules to animals fasted for 16 to 20 hours.

No purgative was given before or after. Details are given of the treatment of batches of foxes at dosage rates of 0·1 cc. to 0·6 cc. per kilo.

The results obtained in some of the experiments appeared to indicate the advisability of withholding food and water for three hours after administration ; otherwise dilution of the drug may occur in the stomach.

A high degree of efficiency was given by 0·2 cc. per kilo and upwards. Hookworms and ascarids were removed almost completely, as were also intestinal flukes and Physaloptera, but it appeared to be ineffectual for the removal of tapeworms. Neither the hard nor the soft capsules appeared to have any advantage over the other as a means of administration, but it appears that inhalation collapse is more likely to occur when the hard capsules are used. Of 13 foxes, for which hard capsules were used, one collapsed, but recovered when artificial respiration was resorted to. Of eighteen animals to which soft globules were given, none collapsed. In all four animals died, but the authors hold the drug responsible for three of these deaths only. Two fatalities occurred in pups one month old. These received the 0·3 cc. rate of dosage, and the indications are that this is too high for so young animals. Diet probably had something to do with the deaths.

It has been found by LAMSON and others that the greater susceptibility of puppies to carbon tetrachloride is due to the fat present as milk. Digestible fat appears to increase toxicity. The authors' experience, recorded elsewhere, is that susceptibility varies not only with individual foxes, but, as has been found when repeated treatments have been given, in the same animal at different times.

They hold that factors other than the magnitude of the dose are concerned in the causation of fatalities. Among these they include: Intestinal stasis, enteritis, and the nature of the food.

Although in the experiments here recorded no purgative was used, it is advised that the drug be used in conjunction with a saturated solution of Epsom salts. HALE and SCHILLINGER, in treating dogs, advise the simultaneous administration of the two medicaments. The drug becomes less dangerous and its efficacy is not impaired.

CIUREA (T.) & DINULESCU (G.). **Ravages causés par la mouche de Goloubatz en Roumanie ; ses attaques contre les animaux et contre l'homme.** [The Ravages caused by the Goloubatz Fly in Roumania.]—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 323–342. With 3 plates.

The authors describe the serious losses among animals and the effects produced in man by the bites of the Goloubatz fly (*Simulium columbaczense* Schiner) in Jugoslavia.

The attacks of this fly are well known to the villagers, who ordinarily succeed in protecting their animals against the pest, but it occasionally happens that the flies appear in immense swarms. This occurred in the spring of 1923, when the venomous bites of the flies were responsible for the death of 16,000 animals.

It appears to be not improbable that the flies were carried long distances by the wind. They also travel parallel to streams. The flies settle on the mucous membranes and on the thinner parts of the skin and become engorged. This occupies about five minutes. Animals attacked may traverse some miles in their attempts to escape the pest. Sometimes they dash into water to avoid the flies. It has been observed that black skinned animals are more severely attacked

than animals of other colours. This appears to be the explanation of the fact that buffalos are the heaviest sufferers.

The flies appeared to take refuge in woods during the middle of the day, for they were observed to attack animals between sunrise and ten o'clock, and again from about four o'clock onwards.

The bite of the fly causes small haemorrhages, and where many bites are close together the area involved may be covered with blood. At the seat of a bite a little button-like swelling forms, and where these are close together large oedematous painful swellings are produced. Animals that have been heavily attacked present symptoms indicative of asphyxia. They move with great difficulty, the mouth is open and the tongue pendulous. The eyes have an anxious expression and respiration is difficult. Death takes place in a few hours. Animals which, although severely bitten, do not succumb within a few hours lose their appetite, show rigors and acceleration of pulse and respiration. The temperature is normal or slightly above normal. They become apathetic, pulse and respiration become almost imperceptible, the temperature falls below normal, and death takes place in about a week.

At the post-mortem examination the principal viscera, and particularly the heart, liver and kidneys, show congestion and degenerative changes. Protective measures include working during hours when the flies are not biting, placing the animals in darkened stables, the use of smoke either to prevent the entrance of flies into the stables or to protect animals while at work. Various decoctions are applied to the vulnerable parts of the skin, among which are absinthe leaves, walnut leaves, hazel-nut leaves, tobacco infusion, mixtures of mineral or vegetable tar with lard, or lard alone.

External applications to bitten areas should be alkaline, and internally cardiac stimulants are used.

BLANC (Georges) & CAMINOPETROS (J.). **La Tick Paralysis observée sur les moutons de la région de Sitia (Crète).** [Tick Paralysis in Sheep in Crete.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 378–381.

Tick paralysis appears to have been known to shepherds in Crete for thirty years. The disease appears at the end of the autumn and persists until March or April. Occasional cases occur at other periods. In some years the disease is severe, attacking one-third of the sheep.

Affected sheep show convulsions and progressive paralysis, and ticks are always found along the vertebral column. Immediately symptoms appear ticks are searched for behind the ears, and oil is used to detach them. It is said that when the ticks are removed at an early stage recovery takes place.

The authors have had a number of ticks for examination (not taken from diseased sheep) and found that two species, *Haemaphysalis punctata* and *Ixodes ricinus*, were represented.

VAN HOOF (L.). **Conservation du pouvoir infectieux de l'*Ornithodorus moubata* nourri sur reptiles et sauriens.** [The Retention of Infectivity by *Ornithodorus moubata* fed upon Reptiles and Lizards.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 376–378.

The author's experiments were carried out as a control to those of RHODAIN, and concerned the retention of infectivity with *Spirochaeta*

duttoni. Van Hoof found that the virus was retained, probably because of its location in the sexual glands. There it would not be influenced by unusual alimentary material. He found that feeding the ticks on reptiles caused a high death rate among them, apparently because the blood is not readily digested.

CAMERON (A. E.). *Sarcoptes* **of Cattle.**—*Parasitology.* 1924. July. Vol. 16. No. 3. pp. 255–265. With 6 text figs.

In the introductory paragraphs of this paper attention is drawn to a point regarding the measurements of the mites. Parallel observations showed that the measuring of mounted parasites may yield results very different from those taken from the living parasite. A tabular statement shows the readings obtained from individual parasites. Mounted parasites are far larger than the living ones.

The sarcoptes of cattle differ from those of the horse in certain points, but it is impossible to indicate these without the author's figures.

BEDFORD (G. A. H.). **The External Parasites of Poultry, with Measures for their Control.**—*S. Africa. Jl. Dept. Agric.* 1924. Aug. Vol. 9. No. 2. pp. 123–140.

This paper deals with ticks, mites, lice, fleas, mosquitos, sand flies, and the pigeon fly.

BATHELLIER (J.). **Premiers résultats zoologiques de l'étude des rats et des puces à Phnom-Penh.** [First Results of a Zoological Survey of the Rats and Fleas at Phnom-Penh.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 372–375.

CHARRIER (H.). **Les Moustiques de la région de Tanger (Maroc).** [The Mosquitos of Tangier.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 570–572.

EVANS (A. M.). **Descriptions of New Mosquitos from South America.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 363–375.

INGRAM (A.) & MACFIE (J. W. S.). **The Mosquitos of Accra.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 263–264.

KOSUGE (I.). **Beiträge zur Biologie der Mikrofilaria immitis.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1924. Aug. Vol. 28. No. 8. pp. 340–351. With 1 chart. [14 refs.]

LEGER (A.) & COUPUT (A.). **Nasomyiase à** *Chrysomyia dux*, **Esch.** [Nasal Myiasis due to *Chrysomyia dux*, Esch.]—*Bull. Soc. Path. Exot.* 1924. May. Vol. 17. No. 5. pp. 375–376.

NÖLLER (W.) & SPREHN (K.). **Die Entwicklung des Leberegels bis zur Zerkarie in** *Limnaea stagnalis*. [The Development of the Liver Fluke up to the Cercarial Stage in *Limnaea stagnalis*.]—*Berlin. Tierärzt. Wochensch.* 1924. July 18. Vol. 40. No. 29. pp. 369–370.

PATTON (W. S.). *Hypoderma crossii* **sp. nov., parasitic in its Larval Stages in Cattle and Goats in the Punjab.**—*Indian Jl. Med. Res.* 1922. Oct. Vol. 10. No. 2. pp. 573–578. With 2 plates & 4 figs.

TAYLOR (E. L.). **On the Ascarids of the Dog and Cat.**—*Ann. Trop. Med. & Parasit.* 1924. Oct. 31. Vol. 18. No. 3. pp. 243–251. With 7 text figs.

BACTERIAL DISEASES.

SOBERNHEIM (G.) & MURATA (H.). **Vergleichende Untersuchungen über die Bedeutung des Infektionsmodus bei der experimentellen Milzbrandinfektion.** [The Comparative Importance of the Various Methods of Infection in Experimental Anthrax.]—*Zeitsch. f. Hyg. u. Infektionskrankh.* 1924. Nov. 10. Vol. 103. No. 4. pp. 691–698.

In investigating questions of this nature the dose of organisms used is of extreme importance. This point appears to have been overlooked in some of the recent work.

The authors' experiments have been carried out with exact doses of suspensions of agar cultures of virulent anthrax bacilli. The cultures used were 20-hour growths.

Intracutaneous inoculations were made on shaved areas on the abdomen. When other methods of inoculation were resorted to care was taken to avoid infection of the skin by injecting through a previously made wound in the skin which was held open during the inoculation. The exposed cut surfaces were then seared with a hot glass rod and painted with collodion. In all cases 4 to 6 animals were inoculated at the same time in order to exclude accidents.

The results in experiments with guineapigs showed that death followed inoculation in all cases, no matter what the seat of infection. Death usually occurred on the 2nd or 3rd day, and the post-mortem appearances were typical.

The results showed that there was no difference of any importance between the intracutaneous and subcutaneous paths. In the experiments performed intramuscular inoculation was actually the most fatal. By the intraperitoneal and intravenous paths the the minimal lethal dose was somewhat higher.

Similar results were obtained with mice inoculated subcutaneously and intravenously.

Experiments were also performed in which capillary glass tubes containing definite amounts of bacterial suspension were placed under the skin and broken after the skin wound had healed. The value of these experiments was discounted, however, because of the possibility of fragments of glass damaging the under surface of the skin when the tubes were broken, and thus converting the inoculation into a cutaneous one. Another objection to this method is that the bacillus is actually being incubated in the subcutaneous tissue during the period required for the healing of the skin wound. In this way the dose may be very materially altered through multiplication of the organisms.

It has also been held that in any form of inoculation there is some wound of the skin, and that although contamination of that wound may be avoided at the time the inoculation is made, the bacilli may eventually reach it either by the blood or the lymph stream, and so cause a skin infection.

These objections are entirely removed by infection via the mouth.

The authors have used sporulating cultures and have administered these in measured quantities direct into the stomach through a tube passed down the oesophagus. Fatal results were obtained, although infection required a far larger dose than parenteral inoculation. Thus, while 1/100,000 part of a loopful of a certain suspension proved fatal by intracutaneous inoculation, the dose required to cause infection

by way of the stomach was 1/10 of a loopful. Death took place on the fourth day. The authors conclude that it is unjustifiable to assert that the skin is the only tissue susceptible to anthrax infection.

It is not difficult to understand why the lethal dose varies with the method of infection.

VELU. **Immunisation du mouton et du bœuf contre le charbon bactéridien par intra-dermo vaccination.** [Immunization of Sheep and Cattle against Anthrax by Intra-dermo Vaccination.]—*Maroc Médical.* 1924. May 15. No. 29. 159–161.

The present communication has for its object the definition of a point of terminology and the specification of the operative technique of intra-dermo vaccination. The author points out that a number of terms have been used for various operations involving the implantation of test liquids such as tuberculin or of vaccines into the skin, and states that to avoid confusion he proposes to use the term intra-dermo vaccination for the method of vaccinating against anthrax.

His reason for resorting to intra-dermo vaccination is that simple cutaneous vaccination and transcutaneous vaccination (ARLOING & DUFOUR) do not permit of exact dosage.

Various parts of the body have been tried as the seat of vaccination, but final choice has rested upon the anal folds beneath the tail. The reasons for so doing were as follows: The anal folds require no preliminary preparation and are readily cleansed. The skin there is easily rendered immobile. By raising the tail the skin is made tense and the needle can be inserted into the skin. Should the needle be passed through the skin no harm results.

GRATIA (A.). **Production d'Anticorps dans la cuti-immunité anti-charbonnneuse.** [The Production of Antibodies in Anti-Anthrax Cuti-Immunity.]—*C. R. Soc. Biol.* 1924. Oct. 7. Vol. 91. No. 3. pp. 795–797.

The author is unable to agree with BESREDKA that antibodies cannot be demonstrated in the serum of animals immunized against anthrax by the cutaneous path, and states briefly that he is able to demonstrate protective properties in the serum of guineapigs protected by cuti-vaccination.

He thinks that if anti-anthrax vaccination is actually more effective by the cutaneous than by the subcutaneous path it is because the skin, being more favourable to the multiplication of the organisms, allows the vaccines introduced to exercise their aggressive powers. The animal body responds with anti-aggressines, which are the real protective substances. Vaccines introduced subcutaneously are rapidly phagocytized and are unable to exert their powers of stimulation of antibody production.

LECLAINCHE (E.) & VALLÉE (H.). **Charbon symptomatique et gangrènes gazeuses chez les bovidés.** [Black Quarter and Gas Gangrene in Cattle.]—*C. R. Acad. Sci.* 1924. June 16. Vol. 178. No. 25. pp. 2024–2027.

This paper has appeared elsewhere and has been abstracted (see this *Bulletin*, Vol. 12, p. 134).

SMITH (Theobald) & LITTLE (Ralph B.). **Studies in Vaccinal Immunity towards Disease of the Bovine Placenta due to** *Bacillus abortus* **(Infectious Abortion).**—*Monographs of the Rockefeller Inst. Med. Research.* 1923. Nov. 15. No. 19. 124 pp.

The authors carried out a number of experiments with living and dead vaccines, but they are not able to add to our knowledge of the subject of immunization against contagious abortion.

FITCH (C. P.) & LUBBEHUSEN (R. E.). **A Study of the Presence of** *Bact. abortus* **in the Milk of Cows which react to the Agglutination Test.**—*Cornell Vet.* 1924. July. Vol. 14. No. 3. pp. 299–302. With 2 tables.

The results obtained by these authors run closely parallel with those obtained by others. They find that approximately 30 per cent. of reacting cows have abortion bacilli in their udders, and that there is no concordance between the agglutinin content of the milk and blood.

EDINGTON (J. W.). **The Bacteriological Study of Fowl Typhoid and Allied Infections with Special Reference to Three Epidemics.**—*Jl. Path. & Bacteriol.* 1924. Oct. Vol. 27. No. 4. pp. 427–437.

MYCOTIC DISEASES.

BIGOT (A.) & VELU (H.). **Contribution à l'étude anatomo-pathologique de la lymphangite épizootique.** [The Morbid Anatomy of Epizootic Lymphangitis.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 374–384.

The authors find that the lesions wherever they occur are structurally the same.

The invaded tissues react by a proliferation of the connective tissue cells, fixed and migratory, which tend to ingest the parasite. An inflammatory nodule is thus formed. An invasion of polynuclear leucocytes occurs more particularly when pyogenic bacteria gain access to the lesion. Three zones are recognizable in a lesion. There is an outer zone of fibrous proliferation, an intermediate zone of mononuclear celled infiltration, and a central area of pus cells and the causal organism, the latter often being present in zooglea.

The conclusion to be drawn is that surgical intervention is called for in the treatment of the disease, as well as specific vaccino-therapy.

BAROTTE (J.) & VELU (H.). **Essais d'isolement en cultures du cryptocoque de la lymphangite épizootique du cheval, par l'emploi de milieux à l'acide citrique.** [The Isolation of the Cryptococcus of Lymphangitis on Media containing Citric Acid.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 540–543.

The authors' recent investigations have led them to try media containing citric acid for the isolation of the cryptococcus.

The first attempts were made with broth, peptone water, and Sabouraud's agar containing 5 per mille citric acid. The latter medium, while proving unsuitable for the cultivation of the organism, did not act upon it injuriously, since subcultures on other media were readily obtained from the small amounts of growth obtained upon it.

The citric acid medium was also used for the cultivation of organisms frequently associated with the cryptococcus in lesions. No growth was obtained with a staphylococcus and mixtures of organisms such as are obtained from contaminated natural lesions. Cryptococci present in a mixture of bacteria did not grow, but subcultures on other media yielded pure growths, all the contaminations having disappeared.

Tests were carried out with a view to determining whether the citric acid exercised an actual sterilizing or merely an inhibitory action, and the results indicated that there was actual sterilization of the accidental organisms.

Further experiments are to be carried out to determine the minimum effective proportion of citric acid.

MIEGEVILLE. **Note clinique sur la blastomycose oculaire de l'âne.** [Clinical Note on Blastomycosis of the Eye in the Donkey.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 543–545.

Blastomycosis of the eye in the donkey is of frequent occurrence in the Beni-Mellal area, Morocco. In 88 per cent. of cases the lesion is unilateral and always in adult or aged animals. In all cases in which bilateral disease has been seen the lesion in one eye has been of recent origin and the other of long standing.

The lesion, which develops very slowly, appears to originate on the posterior border of the membrana nictitans, and takes the form of a little hard nodule. The membrana nictitans appears congested and oedematous, and slight conjunctivitis and keratitis make their appearance. Up to this stage the lesion usually escapes the owner's notice. The nodule increases in size and ulceration occurs. This results in the formation of a muco-purulent discharge which collects at the inner canthus and runs down the face. If the lesion is not attended to it continues to increase in size until it attains the size of a pigeon's or even a hen's egg. By this time it has almost entirely displaced the eye.

Later the maxillary sinus is involved by way of the osseous portion of the lachrymal canal, and a rarefying ostitis is produced with deformation and sometimes necrosis of the bone.

On four or five occasions the author has found the sinus apparently completely filled with a tumour-like mass, but he has never seen invasion of the nasal cavities. He has not been able to undertake serious bacteriological or histological examinations of the growths, but the smears that he has examined have invariable contained a cryptococcus which is possibly the cause of the disease.

There is evidence to show that the condition, if not contagious, is inoculable. Treatment follows general surgical practice, but relapse is frequent.

VELU (H.). **La blastomycose des voies lacrymales de l'âne et son inoculabilité.** [Blastomycosis of the Lachrymal Tract in the Donkey and its Inoculability.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 545–547.

Blastomycosis of the eye, which is of very common occurrence in all parts of Morocco, appears to be caused by an organism morphologically resembling *Cryptococcus farciminosus*. Up to the present all attempts to cultivate it upon media used for that organism have failed, but it has been found to be inoculable from donkey to donkey. The material used was an emulsion of one of the tumour-like growths, and the dose used was about 0·1 cc. inoculated under the conjunctiva. Three donkeys were used. In one the reaction to the inoculation was very prompt, a lesion making its appearance six days later. In the other two the periods of incubation were 30 and 45 days respectively. The lesions developing after the shorter periods of incubation (6 and 30 days) behaved like normal lesions, but in the other animal the lesion remained small and after a time became sclerosed and shrunken. In the conjunctival secretions the organism exactly resembles the *Cryptococcus farciminosus*. In scrapings from the lesions the parasite occurs singly or in groups of 8 to 10 elements embedded in a mass of amorphous material. Impression preparations show that these zooglea may contain as many as three hundred individual elements.

Up to the present filamentous forms and ascospores are not known. The name *Cryptococcus mirandei* is proposed.

BIGOT (A.). **Différents procédés de coloration des cryptocoques pathogènes en médecine vétérinaire.** [Staining Methods for Pathogenic Cryptococci.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 547–551.

The author reviews the various methods which have been used for staining the parasite and concludes that none of them are very satisfactory.

He has devised a method which is said to stain the protoplasmic contents intensely, leaving the envelope refractile.

Fixing is of first importance, and only preparations fixed in Bouin-Duboscq have given good results.

Smears and impressions are fixed in Bouin for 20 to 24 hours. They are then washed in water, treated with lithium alcohol and again washed in water.

Tissues for sectioning are fixed in Bouin-Duboscq for 24 to 48 hours, according to their size. They are then treated in the lithium bath to effect decolorization. This decolorization of the section is repeated after passage to absolute alcohol and 90 per cent. alcohol.

Smears and impressions are stained with carbol violet for at least 4 hours. Sections must be stained for 24 to 30 hours. They are placed in Lugol solution for 5 minutes, then thoroughly decolorized. Eosin in water or eosin-orange may be used as counterstains. Staining troughs should be used to avoid deposits falling on the specimens.

Mann's stain gives good results if it be allowed to act for 16 to 24 hours for smears and 30 hours for sections. Aniline safranine should be applied for 5 to 10 hours to smears and 25 to 30 hours to sections. Haemalum requires 15 hours for smears and 30 for sections. Giemsa requires 20 to 30 hours.

BIGOT (A.) & VELU (H.). **Blastomycose des voies lacrymales de l'âne. Anatomie pathologique.** [The Morbid Anatomy of Blastomycosis of the Lachrymal Tract in the Donkey.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 551–553. With 1 plate.

Three zones can be made out in all the lesions examined.

Lymphocytes are most numerous in the outer zone, while plasmocytes are by far the most numerous in the middle and inner zones. The plasmocyte cells are generally isolated in vacuoles or on the surface of connective tissue fibres, and never present an appearance suggestive of a mass of epithelioid cells.

In the central zone vacuole-like spaces are found which contain masses of the parasite embedded in an amorphous matrix. Plasma cells are sometimes present on the surface of these masses. The lesion is non-vascular.

DISEASES DUE TO FILTERABLE VIRUSES.

AUSTRALIA (Commonwealth of). Dept. of Health. Service Publication (Veterinary Hygiene) No. 1. **Rinderpest in Western Australia in 1923,** by ROBERTSON (W. A. N.). pp. 1–58. With 9 plates and 5 maps.

This report contains a fully detailed account of an outbreak of rinderpest which occurred in Western Australia in November, 1923. The first cases occurred in a dairy herd in the Beaconsfield area, and within a short time a number of herds became affected. A second centre of infection was discovered at Belmont, and a quarantine area of 30 miles from Fremantle was proclaimed, and the border was patrolled to prevent all movement of cattle, food and vegetables.

On further confirmation as to the nature of the disease it was decided that inoculation of any kind was not indicated.

Veterinary assistance from other States was promptly forthcoming, and with Government assistance a campaign of eradication was carried out.

Details are given of a number of post-mortem examinations and of experimental inoculations. The latter were not carried to a conclusion as it was decided to be unwise to continue centres of infection.

All the affected herds could be shown to have been in contact to some extent.

The evidence appeared to incriminate sheep brought into Fremantle as live ship's stores (for Mohammedans) as the source of the infection. These were purchased by local butchers for slaughter.

The factors which assisted in the eradication of the disease were :—

1. The somewhat sparse cattle population.
2. Little interchange of stock.
3. The existence around Fremantle of a natural barrier in the form of desert country supporting no cattle.
4. The light, dry, sandy soil.
5. The season at which the outbreak occurred. Hot, cloudless weather.
6. The policy adopted of slaughtering all animals within a mile radius of an outbreak.

KAKIZAKI (C.). **Experimental Studies on the Prophylactic Inoculation against Rinderpest.**—*Kitasato Arch. Exp. Med.* 1924. Oct. Vol. 6. No. 2. pp. 139–197. With 13 charts.

The author has carried out a number of experiments with a view to determining under what conditions the rinderpest virus in splenic pulp can be attenuated by means of glycerin and the effects of such a vaccine.

His experiments cover an immense amount of ground, but it is a matter for regret that so few experiments have been carried out in each section. In many instances controls have been omitted completely.

The actual method of preparing the vaccine was described by the author in 1918 and is not included in this paper.

He finds that an emulsion of spleen in glycerin may retain its antigenic properties after it has become non-infective. Calves treated with two doses of vaccine were protected for 5-6 months, but calves treated with a dose of vaccine followed by virulent blood were protected for more than 12 months. An interval of 7-8 days must elapse between the use of the vaccine and the inoculation with virulent blood, or the calf may become infected. The method appears to be inferior to the serum-simultaneous method.

SCHEIN (H.) & JACETOT (H.). **A propos de la vaccination contre la peste bovine par virus attenué.** [Vaccination against Rinderpest by means of Attenuated Virus.]—*Rev. Gén. Méd. Vét.* 1924. Sept. 15. Vol. 33. No. 393. pp. 493–500.

The authors refer to the results claimed by VAN SACEGHEM in the attenuation of the virus of rinderpest and state that it is a matter for surprise that such good results should have been obtained. One of the authors carried out experiments on lines similar to those followed by VAN SACEGHEM in collaboration with YERSIN some 25 years ago. No good results were obtained and the method was abandoned. These experiments are recorded in the present paper as they have not been published previously. Recently, further experiments have been carried out on similar lines.

Ten calves were treated in the manner suggested by VAN SACEGHEM. Seven died, one contracted a rather severe attack of the disease, and the remaining two passed through mild attacks. Four goats so treated all died.

The virulence of the rinderpest virus does not appear to be capable of being modified by any of the ordinary means. Either it is killed or it is left unchanged. By passage through goats and buffalos it has appeared to be possible to modify the virulence for cattle to some extent. The varying mortality in outbreaks is due to variations in susceptibility rather than variations in virulence.

DOUTRESSOULLE. **Rapport sur la recherche d'une methode d'immunisation active des veaux non sevrés, provenant de mères réfractaires à la peste bovine.** [Attempts to devise a Method of immunizing against Cattle Plague the Calves of Animals that are Resistant.]—*Rec. Méd. Vét.* 1924. Aug. 15. Vol. 100. No. 15. pp. 464–468.

It has already been shown that the calves of resistant cows become susceptible to rinderpest when they are weaned, the susceptibility increasing with age.

A small number of experiments have been carried out and these appear to indicate that the calves of refractory animals may be inoculated with virulent blood alone without much risk.

DE MAGALHAES (O. C.). **Peste dos Polmões.** [Abscess Plague.]—*Mem. Inst. Oswaldo Cruz.* 1923. Vol. 16. No. 1. (English Version.) pp. 185–286. With 51 illustrations.

The author describes a disease which appears to be a purulent lymphangitis of cattle, but he recognizes acute forms of the disease in which death is sudden and not preceded by any recognizable symptoms.

The author states that the pus obtained from unruptured abscesses always contained large numbers of bacteria of different types. For a long time he failed to obtain cultures from the pus, but finally discovered that this was because the organisms present were anaerobes.

The lesions present in the so-called " fulminating " cases are those of a septicaemia.

In the chronic form the skin is " riddled with abscesses of different sizes " which if they have not burst become enclosed in thick fibrous capsules.

When the muscles are involved the pus burrows into their substance and does not become encapsuled.

The cause of the disease is held to be a filtrable virus which is associated with the various organisms found in the pus.

It has to be admitted that it is difficult to obtain a clear idea of the subject from the author's English version of his work.

STAUDFUSZ (R.), SCHULTZ (E.), SCHNAUDER (F.), PETERS (W.), & FRENZEL (W.). **Untersuchungen über die ansteckende Blutarmut des Pferde.** [Infectious Anaemia of Equines.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. July. Vol. 51. No. 2. pp. 154–176.

The principal difficulty experienced in connexion with infectious equine anaemia is that of establishing a diagnosis. The authors bring forward further evidence to show that inoculation of rabbits with suspected blood greatly facilitates a diagnosis. A diagnosis can be made within a fortnight, based upon the reduction in the number of corpuscles in the test animal's blood.

They further show that the virus can be carried on in rabbits in series, and also obtained evidence that the virus is present in the saliva, urine and faeces of infected horses.

OPPERMANN. **Ziele und Wege der neueren Forschungsarbeiten über die infektiöse Anämie des Pferdes.** [New Investigations in connexion with Infectious Equine Anaemia.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. Sept. 1. Vol. 51. No. 3. pp. 260–279.

The author states that when experimental inoculation of rabbits with material from a case presenting suspicious symptoms either fails or yields a doubtful result, steps may be taken which will render a

subsequent test positive. This may be achieved by bleeding the horse, withholding water for 24 hours, and then watering copiously. Tests made with blood taken a few days later yield positive results.

Oppermann is opposed to the view that the disease is insect transmitted—the facts, in his opinion, do not lend support to this view.

It has been discovered that the serum of horses affected with anaemia in a minimum dilution of 1 in 20 is capable of agglutinating the red corpuscles of rabbits.

However, if the horse has been infected for a long period and is obviously ill the reaction does not take place. This is said to be due to the appearance of anti-agglutinins in the horse's serum.

Full details of technique are promised later.

SCHUCHMANN (K.) & KARMANN (P.). **Die Diagnose du infektiösen Anämie der Pferde durch den Kaninchenversuch nach Oppermann.** [The Diagnosis of Equine Infectious Anaemia by the Inoculation of Rabbits.]—*Berlin. Tierärzt. Wochensch.* 1924. Sept. 12. Vol. 40. No. 37. p. 497–502.

The authors confirm the value of rabbit inoculation as a means of diagnosis of infectious anaemia in equines, but point out that doubtful results are obtained in some cases.

The value of the method is somewhat reduced by the fact that repeated blood counts have to be made. This requires special skill, but at the same time is very tedious.

Until some more simple method of diagnosis is devised the application of the inoculation test will be limited.

HELM (R.). **Die kunstliche Übertragung der infektiösen Anämie des Pferdes auf Meerschweinchen und Kaninchen.** [The Experimental Transmission of Infectious Equine Anaemia to the Guineapig and the Rabbit.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. Oct. 1. Vol. 51. No. 4. pp. 365–391.

The author claims to have been able to transmit infectious equine anaemia to guineapigs and rabbits.

In guineapigs the blood showed the changes characteristic of anaemia. Polychromasia was present in proportion to the severity of the symptoms shown.

The duration of the changes in the blood varied from a few days to a few weeks.

For the purpose of examining the blood changes films were dried in the air, fixed in alcohol and stained in alkalinized Giemsa. In some specimens blood platelets were very numerous, and from some of the appearances observed the author came to the conclusion that they originate in the red blood corpuscles.

Detailed observations have not been made regarding the white corpuscles, but in all cases there was a more or less marked leucocytosis. In a few instances in which the blood changes were very marked there was a pronounced increase in the neutrophile polynuclear leucocytes. Of 67 guineapigs inoculated markedly positive results were obtained in 29, less marked results in 14, 7 were doubtful, 7 were negative, and 9 died a few days after inoculation. Of three guineapigs inoculated from another guineapig, two reacted and one gave a doubtful result.

A preliminary investigation showed that the average number of red cells in the guineapig is 5,000,000. Infection resulted in a reduction to 3,000,000 in some cases, but the figure never fell below that.

The amount of blood obtainable by ear puncture in the guineapig was not sufficient to permit of quantitative tests for haemoglobin being carried out. Infection in all cases was associated with a rise of temperature.

Microscopic examination of the organs of infected guineapigs showed that in most cases there were perivascular infiltrations in the liver.

In rabbits the period of incubation is variable, and in the author's experiments it ranged from one day to eight weeks. There was great variation in the severity of the symptoms presented.

Contrary to what is the case in the guineapig, the blood of infected rabbits does not present a typical appearance. On the other hand, the reduction in the number of red cells is very pronounced.

Clinically, the infection was characterized by a rise of temperature and catarrh of the upper air passages, and abortion in the case of pregnant animals.

In most cases the infection was transmitted by intraperitoneal inoculation, but in two instances the disease was transferred to healthy animals by the use of the same needle for bleeding the diseased and healthy rabbits, one immediately after the other.

The observation of JAFFÉ and SILBERSTEIN that passages through rabbits increases the virulence of the virus was confirmed.

DONATIEN (A.) & LESTOQUARD (F.). **L'anémie pernicieuse du mouton et de la chèvre.** [Pernicious Anaemia of the Sheep and Goat.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 386–391.

The authors find that this disease occurs among sheep and goats in Algeria. They have observed it among these animals purchased by the Pasteur Institute (Algeria) for other experimental purposes.

The disease is characterized by a very unsteady temperature, loss of condition, and death in a few weeks or months. Experimentally, it has been found that the disease is due to a filterable virus which can be transmitted to the sheep, goat, horse, ass, and calf. The principal lesions are to be found in the cortical portion of the suprarenal capsules. The cortical cells show homogeneous cytoplasm and vacuolation of the nuclei; oedema, haemorrhages and diapedesis are also seen.

RINJARD (M.) & DEGOIS (M.). **Hémo-vaccination et aphtisation sous cutanée au Centre national zootechnique de Vaux-de-Cernay.** [Haemo-vaccination and Subcutaneous Aphthisation in Foot-and-Mouth Disease.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 392–400.

On April 6th, 1924, a case of foot-and-mouth disease was detected in an animal at the National Zootechnical Centre at Vaux-de-Cernay. It occurred in a bull which had been placed in a stall at the Saint-Benoit farm the previous day. This animal, among others, had been shown at an Agricultural Show. These had not been distributed to the various farms until they had been under observation for eleven

days. Nothing had been observed during this period, but no temperatures had been taken and no examinations had been made of the buccal mucous membranes. The first case having been detected the day after the animals had been scattered to the various premises, there was a fear that others might be affected and distribute the contagion. Two days later the disease made its appearance on another farm.

Three years previously one of these farms had suffered from a severe visitation of foot-and-mouth disease. The prospects on the present occasion were more serious since there were larger numbers of more valuable animals on the premises.

About 150 litres of blood from convalescent animals were available for inoculation purposes and it was decided to inoculate immediately the calves and lambs, heifers, bulls, and those animals which had recently won prizes at the agricultural show.

The various activities of the Centre made it essential that the outbreak should be cut short and the losses reduced if that were possible.

The injections were given on the lines suggested by VALLÉE and CARRÉ, with the exception of three valuable bulls which were seriously ill. These were given several litres of the blood.

At the beginning each animal was injected subcutaneously with a mixed sample of blood obtained from, as a rule, 16 convalescents. Young animals received 2 to 3 cc. per kilo. live weight, and adults 1·5 to 3 cc.

This was followed 1 to 5 days later by an inoculation with mixed virulent sera. The lambs were given 2·5 cc., the cows 4 cc., and the other bovines 5 cc. The blood available sufficed for the injection of 236 lambs, 36 calves and 84 cows.

In the flocks only the lambs were treated and a risk of losses among the adult sheep had to be taken. The materials available were not sufficient to deal with all the animals. The sheep were selected because the results of the disease are made good far more rapidly in them than in bovines. In addition to this, it subsequently appeared that in sheep the disease became generalized in a benign form very rapidly.

At Saint-Benoit, the only farm upon which cattle were attacked at the moment, 14 animals were exposed to contagion for the double purpose of providing virus and to act as controls of the susceptibility of the herd.

Thirty-three animals which became infected at pasture were inoculated subcutaneously with 1 cc. of virulent serum, and at the same time all the animals in the uninfected stalls were similarly inoculated.

Two bulls and a cow which were inoculated after the development of the disease made uneventful recoveries. Eight animals which had received the convalescent blood developed the disease within 48 hours, and before any virus had been given. Thus the statement made by the Research Laboratory that the disease cannot be arrested if inoculations are given during the period of incubation was confirmed.

Nineteen calves which received blood and virus remained free from infection, although three of them were in the infected shed, and two of these received the blood inoculation only 24 hours before their dams developed the disease. They remained with their dams. The milch cows and the working oxen which were treated all resisted

infection. There was no loss of milk, and the oxen continued to work.

Ninety-five Southdown lambs were inoculated and none of them contracted infection even from the ewes, among which there were as many as thirty cases at one time.

The 33 animals which were inoculated subcutaneously with virulent serum passed through a mild attack of the disease.

On another infected farm 52 lambs were subjected to haemo-vaccination and all remained healthy although with infected ewes.

Haemo-vaccination was carried out on two farms where the possibility of infection was suspected, but where no cases had actually occurred.

On one of these 39 bovines were inoculated with blood and virus and remained healthy.

At the other 89 lambs were inoculated. These remained healthy when the disease broke out among adult sheep later. As blood was not available in sufficient quantities at the time 8 calves, 11 cows, and 6 oxen were left for several days before they were inoculated. Six animals were kept in contact with these with a view to ascertaining whether animals undergoing haemo-vaccination were a source of danger to others.

Unfortunately 4 of the cows and 1 calf which had been vaccinated developed typical symptoms of the disease. The disease also broke out among the control batch. In these it was far more severe than in the vaccinated animals.

The blood used in those inoculated was a mixture of only eight different samples. The protective power of such mixtures is less than when a larger number of bloods are mixed, and larger doses should have been used.

Of the animals left to test the susceptibility of the herd, and including those which were in the incubative stage before inoculation, 22 developed the disease in a severe form. Six escaped infection.

VALLÉE (H.) & CARRÉ (H.). **Sur l'obtention du sérum anti-aphteux.** [The Preparation of Anti-Foot-and-Mouth Serum.]—*Rec. Méd. Vét.* 1924. July 30. Vol. 100. No. 14. pp. 359–363.

The authors have followed the lines laid down by LIGNIÈRES, but they failed to produce an effective serum.

FROSCH (P.) & DAHMEN (H.). **Die Morphologie und Kultur des Maul- und Klauenseucheerregers.** [The Morphology and Cultivation of the Causal Organism of Foot-and-Mouth Disease.]—*Arch. f. Wissenschaft. u. Prakt. Tierheilk.* 1924. July. Vol. 51. No. 2. pp. 99–122. With 2 plates and 1 text fig.

This paper elaborates the earlier report of the discovery of the causal organism of foot-and-mouth disease. The claim is definitely made that cultures can be obtained on solid media and that these cultures are composed of minute colonies which are only visible when highly magnified. The morphology of the organism itself was revealed by photographic means alone. For this purpose ultra-violet light of a definite wave length was used. The organism is described as a short rod about 0·1μ in length.

In the cultivation of the parasite Dahmen first passed the liquid through a Berkefeld filter to free it from accidental contaminations. All previous experiments in the cultivation of the virus had been carried out with liquid media, turbidity being as a rule the index of growth. Dahmen turned his attention to solid media so that the question of actual growth, by obtaining visible colonies, could be definitely settled, and also to avoid as far as possible the simple transference of virus from tube to tube without actual multiplication taking place. Further incubation was carried out at temperatures below that of the body, the argument in support of this being that the disease develops in superficial parts only, and at the extremities where the temperature is lower. Dahmen considers that the fluid in the bullae is a reaction product, and consequently inimical to the virus. It was therefore necessary to separate the virus from the fluid. It is claimed that this was found to be possible by prolonged centrifuging at high speed.

With the sediment so obtained tubes of culture media were inoculated and it is claimed that cultures were obtained. These were carried on in sub-cultures and the virulence of these was tested by guineapig inoculation. One strain was carried through 23 generations and another through 5.

GINS (H. A.) & FORTNER (J.). **Experimentelle Maul- und Klauenseucheinfektion und -immunität beim Meerschweinchen auf dem Fütterungs- und Luftwege.** [The Infection of Guineapigs with Foot-and-Mouth Disease and their Immunization against it by the Alimentary and Respiratory Tracts.]—*Zeitsch. f. Hyg. u. Infektionskrankh.* 1924. Nov. Vol. 103. No. 4. pp. 699–704.

In view of the ease with which foot-and-mouth disease spreads among cattle, and the readiness with which guineapigs may be infected experimentally, it is remarkable that the disease does not spread among guineapigs by contact. The authors have carried out experiments with a view to ascertaining whether it is possible to infect guineapigs either by the alimentary or respiratory tracts.

In the first experiments a dilution of infective lymph was introduced into the stomach by means of an elastic catheter passed down the oesophagus. Of 12 guineapigs treated in this way, 2 developed foot-and-mouth disease lesions, the period of incubation being 12 days. Two others although they showed no signs of infection were subsequently found to be immune.

It was desired to ascertain whether the virus entered the blood in the infective or in the immunizing form by daily inoculations of other guineapigs, but shortage of guineapigs prevented this from being carried out. Six guineapigs which failed to become infected also acquired no immunity.

For infection via the respiratory tract three methods of injection were used. It was introduced into the nasal cavity either as a spray or by means of a capillary tube, but by these methods there could be no guarantee that it did not reach the alimentary tract. In later experiments, therefore, it was introduced into the trachea direct. The results obtained showed that typical foot-and-mouth disease could be produced in guineapigs by direct spraying of the infective material on to the nostrils. The course of the disease in such cases

resembles that produced by intravenous injection, that is to say, the aphthae appear simultaneously; at least there are no primary vesicles on the tongue or buccal mucous membrane. In one instance inhalation of virus produced very strong immunity. In five cases neither infection nor immunity resulted. The direct introduction of the virus into the trachea failed to set up infection or to produce immunity, and it would thus appear that the virus does not gain entry to the body by way of the epithelium of the lower parts of the respiratory tract.

Of four animals treated by the introduction of the virus into the nose, one developed the typical disease, one was firmly immunized, and the remainder did not react in either way. It is thus established that guineapigs can contract foot-and-mouth disease by way of the alimentary or respiratory tracts, but it is probable that this does not occur under natural conditions because the quantity of virus taken in is too small to set up either infection or immunity.

The question of the natural method of infection in cattle remains unsolved.

BEATTIE (J. M.) & PEDEN (D.). **Rats as Possible Carriers of Foot-and-Mouth Disease.**—*Jl. Path. & Bact.* 1924. Oct. Vol. 27. No. 4. pp. 415–424. With 4 figs.

The authors describe certain lesions of the feet, tongue and lungs which developed in rats inoculated from lymphatic glands taken from carcasses of cows slaughtered because they had been in contact with foot-and-mouth infected animals. They were unable to supply evidence that the disease was actually foot-and-mouth disease as they were unable to carry inoculation experiments out upon cattle.

The lesions found included vesicles and ulcers on the feet and tongues. Glandular lesions took the form of caseous degeneration.

REMLINGER (P.). **Sur un virus de rue renforcé recueilli au Maroc.** [A Reinforced Strain of Street Virus obtained in Morocco.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 538–539.

It is well known that the virus of rabies is very variable in virulence. Subdural inoculation of the rabbit usually causes death in about a fortnight, but the period may be shorter or considerably longer. Strong viruses may cause death on the 7th or 8th day, and when passed on in rabbits death constantly occurs after the same interval. They thus behave like fixed virus. Such cases are rare, and have been observed chiefly in Italy.

The virus obtained in Morocco had the following history:—

A fox, eighteen months old, had been in Tangier for about a year. It was born at Saffi, in Morocco. Once arrived in Tangier it had not left it again. The fox was found one day to have a bleeding wound on its nose. Three or four weeks later the typical symptoms of dumb rabies developed. Death occurred on the fourth day.

An emulsion of the medulla was used for subdural inoculation of a rabbit and rabies developed on the 8th day, with death on the 9th. The brain of this rabbit was used for the inoculation of a second. The disease appeared on the 6th day and death occurred on the day following. Eight subsequent passages were carried out and death

occurred in all between the 6th and 8th days; there being one day's interval on every occasion between the appearance of symptoms and death. The virus would therefore appear to possess an exalted virulence. Naturally attenuated viruses have never been encountered by the author in Tangier.

GALLEGO (Abelardo). **Contribución al diagnóstico histológico de la rabia. Método rápido, sencillo y seguro para la coloración de los corpúsculos de Negri en los cortes.** [The Histological Diagnosis of Rabies. A Rapid, Simple and Certain Method of Staining Negri Bodies in Sections.]—*Rev. de Hig. y Sanidad Pecuarias.* 1924. Aug. Vol. 14. No. 8. pp. 499–502. With 2 figs.

The steps of the procedure are as follows:—

1. Fragments of the brain tissue, about 5 mm. thick, are fixed by boiling in 10 per cent. formaldehyde for 1–5 minutes.
2. Sections, 10–20μ thick, are then cut by the freezing microtome and treated for half-a-minute in solution by (*a*) distilled water 10 cc., nitric acid 1 drop, liq. ferri perchlor. diluted 1 in 10, 1 drop.
3. Without washing, the section is stained for 5 minutes in solution (*b*) diluted 7·5 in 100: distilled water 10 cc., Ziehl's carbol fuchsin 15 drops, acetic acid 1 drop.
4. Wash in water and treat for 5 minutes with (*c*) distilled water 10 cc., formol 2 drops, nitric acid 1 drop, liq. ferri perchlor. (diluted 1 in 10) 1 drop.
5. Wash in water and stain for one minute in (*d*) equal parts of 10 per cent. watery indigo carmine and saturated watery picric acid.
6. Wash, dehydrate, clear in carbol xylol, and mount in Canada balsam.

The nuclei of the cells are coloured violet, the protoplasm blue or greenish-blue, the ground substance of the Negri bodies green or greenish-red, their internal structure very pale violet. The whole process occupies only 20 minutes and the time may be even further reduced by using 30 drops of the fuchsin in stage 3 and staining for one minute only, and treating in stage 4 for one minute instead of five, but "these preparations have not the beauty of those made by the former detailed method."*

MICHALKA (J.). **Die Diagnose der Wut bei Tieren.** [The Diagnosis of Rabies in Animals.]—*Seuchenbekämpfung.* 1924. Vol. 1. No. 5-6. pp. 147–152.

This paper is a summary of the possible methods of diagnosis of rabies in animals which are applicable ante- and post-mortem. It contains nothing new.

PFEILER. **Bemerkungen zu verschiedenen Seuchenfragen, insbesondere zür Züchtung des Erregers der Maul- und Klauenseuche.** [Observations on Epidemics, particularly in connection with Foot-and-Mouth Disease.]—Reprint from *Der Praktische Landwirt.* 1924. June 6. No. 23.

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* Summarized by Dr. H. Harold SCOTT.

MISCELLANEOUS.

ZWICK (W.) & SEIFRIED (O.). **Untersuchungen über die in Hessen gehäuft auftretende Seuchenhafte Gehirn- und Rückenmarksenzundung (Bornasche Krankheit) bei Pferden.** [Investigations in connection with the So-called Borna Disease of Horses.]—*Berlin. Tierärzt. Wochenschr.* 1924. Aug. 29. Vol. 40. No. 35. pp. 465–471.

The disease has a rather wide distribution in Germany, but no references to its occurrence in Hesse have as yet appeared in the literature.

The disease as it occurs in Hesse presents the same picture as in other parts of the country.

Post-mortem examination reveals no macroscopic lesions save some hyperaemia of the cerebral convolutions. Actual haemorrhages have not been observed in either the substance of the central nervous system or in the meninges.

Microscopic examination reveals vascular and perivascular infiltrations in the brain and spinal cord with rounded cells. These lesions are more numerous in the anterior part of the brain, and gradually become more scanty as one examines the more posterior parts. It has been suggested that this is an indication that infection is by way of the nasal cavity.

Zwick and Seifried have found cellular infiltrations along the course of the optic nerve.

The authors are able to confirm JOEST's statement that cell inclusions, which are perhaps of a specific nature, occur in the large ganglion cells in the brain, *e.g.*, Amnion's horn, etc. It is noted that these may not be detected if the material examined is not fixed while in fresh condition. The inclusions appear to degenerate rapidly. These bodies were found by JOEST in an intranuclear position. Zwick and Seifried have seen them in extra-nuclear situations. An attempt was made to transmit the disease to a horse experimentally, but without success.

The cause of the condition has not been identified with certainty.

LOTHES & PROFÉ. **Zur Aetiologie der Dürener Krankheit.** [The Cause of Düren Disease.]—*Berlin Tierärzt. Wochenschr.* 1924. Sept. 19. Vol. 40. No. 38. pp. 513–519.

The authors are of the opinion that the cause of this condition is in some way connected with the use of trichlorethylene for the extraction of soya beans, but they admit that they cannot state conclusively that this is so.

GRATIA (A.) & RHODES (B.). **Production d'Anticorps bacteriolytiques et hémolytiques par la voie cutanée.** [The Production of Bacteriolytic and Haemolytic Antibodies by the Cutaneous Path.]—*C. R. Soc. Biol.* 1924. Oct. 7. Vol. 91. No. 28. pp. 797–798.

The authors have repeated the experiments of CIUCA and BALTEANU regarding the protection of guineapigs against cholera by the intraperitoneal and cutaneous paths.

These authors were unable to demonstrate antibodies in the serum of the later amnials. Gratia & Rhodes find no differences in the immunities possessed by the two groups.

MEYER (S.). **Die Blutmorphologie einiger Haus- und Laboratoriumstiere unter physiologischen und pathologischen Bedingungen.** [The Morphology of the Blood of Certain Domesticated and Laboratory Animals in Health and Disease.]—*Folia Haematologica.* 1924. Aug. Vol. 30. No. 3. pp. 195–229. With 2 plates in colour.

By examining the blood of a total of 173 animals, the author has added to our knowledge regarding the corpuscular elements in the blood of the horse, ox, dog, ass, pig, guineapig, rabbit, mouse and fowl. Some of the animals were normal and some diseased. For detailed reference the original paper should be consulted.

BOITEUX (R.). **Description d'une conserve à bouillon stérile non scellée à la lampe.** [An Apparatus for Storing Broth in a Sterile Condition.]—*Ann. Inst. Pasteur.* 1924. Oct. Vol. 38. No. 10. pp. 873–878. With 2 text figs.

The author figures and describes an apparatus in which broth can be stored in a sterile condition, but which allows quantities to be withdrawn as required without risk of contaminating the remainder. Since detailed description is requisite for the clear understanding of the apparatus it is impracticable to make an abstract of any value.

GERNEZ (C.). **Contribution à l'étude de la cuti-immunisation. Production d'anticorps par inoculation cutanée.** [The Production of Antibodies in Immunization by the Cutaneous Path.]—*Ann. Inst. Pasteur.* 1924. Oct. Vol. 38. No. 10. pp. 892–908.

With a view to throwing light upon the question of the presence or absence of antibodies in the general circulation of animals immunized by the cutaneous path, the author has carried out a number of experiments using blood corpuscles as his antigen. These were convenient to work with for the reasons that haemolysins are readily detected, dosage can be accurately graduated, their composition is constant, and penetration of the skin can be verified readily by histological examination. The rabbit was selected as the experimental animal for the reason that so many accounts have been published regarding the production of haemolysins in this species by subcutaneous, intravenous and intraperitoneal inoculation that there would be plenty of control records to check the results of intradermal inoculation against; the corpuscles used have been those of the goat and of man. It is easy to produce anti-goat haemolysins in the rabbit, but antihuman haemolysins are far less readily produced. Rabbit serum not infrequently contains anti-goat haemolysin, but very rarely anti-human haemolysin.

The corpuscles have been used for inoculation into the dermis and have also been applied as a dressing on shaven areas of skin. The later method is called epidermic inoculation by the author.

CANHAM (A. S.). **Ophthalmia of Sheep.**—*S. Africa. Jl. Dept. Agric.* 1924. June. Vol. 8. No. 6. pp. 581–582.

Ophthalmia of sheep is exceedingly infectious; great care therefore should be exercised in isolating all animals showing lachrymation.

Treatment is best carried out by instilling the following solution into the eyes with a fountain pen filler :—

Formalin	4 drachms.
Tinct. opii	1½ drachms.
Aqua	1 pint.

This should be used once daily while lachrymation persists.

Should ulceration occur, the solution used should be a 2 per cent. solution of hyposulphite of soda, to which tincture of opium has been added in the proportion of 10 minims per ounce.

After lachrymation a mixture containing equal parts of 1 per cent. atropine sulphate and 4 per cent. alum should be used to clear up the opacities that may be left.

Sheep apparently cured should be kept away from the healthy animals and carefully examined at short intervals for a fortnight.

MARSH (C. W.) & CLAWSON (A. B.). **The Meadow Death Camas (*Zygadenus venenosus*) as a Poisonous Plant.**—*U.S.A. Dept. Agric. Bull. 1240.* 1924. June 27. pp. 1–13.

Four species of *Zygadenus* occur in the Western States, and in the literature regarding poisonous effects there has been some confusion between them.

Sheep are the principal victims, but horses are not infrequently poisoned by it. The plant is toxic for cattle, but pigs probably escape through vomiting. *Z. venenosus* is probably of equal toxicity to *Z. gramineus* and these are many times more toxic than the other two species, *Z. paniculatus* and *Z. elegans.*

While the toxic doses of *Z. venenosus* and *gramineus* are about the same, the lethal dose of the latter is much smaller.

While the toxic dose of *Z. venenosus* is much smaller than that of *Z. paniculatus,* the lethal dose is about the same.

The symptoms are salivation, nausea, weakness, depression of temperature, and may be expected to appear on an average about two hours after the ingestion of the plant.

The principal organ affected is the kidney, where there is acute parenchymatous nephritis. It is noted, however, that only one animal was subjected to post-mortem examination.

The toxic dose of the plant for the sheep appears to vary from 0·3 lb. per 100 lb. body weight upwards.

GUNN (J. W. C.). **Slangkop Poisoning.**—*S. Africa. Jl. Dept. Agric.* 1924. Aug. Vol. 9. No. 2. pp. 141–142.

Slangkop is a name applied to different plants, but all belong to the Liliaceae. All that have been examined have the same action.

KENYA. **Report of the Proceedings of the Fifth Pan-African Veterinary Conference held at Nairobi, April 6th to 14th, 1923.**—pp. 128+2. With 9 illustrations. 1924. Nairobi: Govt. Press.

The Chairman proposed that the meetings should, as far as possible, take the form of a round-table gathering, delegates being permitted freedom of speech and questioning.

The proceedings were in the nature of a debate, papers in the ordinary sense of the term not being read.

The subjects dealt with were (*a*) Specific Diseases: (1) Pleuro-pneumonia; (2) Rinderpest; (3) East Coast Fever, Tick Destruction and Tick-borne Diseases; (4) Trypanosomiasis and Tsetse Bionomics; (5) Horse-sickness; (6) Anthrax; (7) Black-quarter; (8) Gallamziekte; (9) Contagious Abortion; (10) Avian Diseases; (11) Helminthiasis; (12) Skin Diseases; (13) Plant Poisoning; (14) Ulcerative Lymphangitis; (15) Swine Fever; (16) Rabies. (*b*) Pathological Research. (*c*) Disease Control. (*d*) Grazing and Water Facilities. (*e*) Stock Improvements. (*f*) Stock Economics.

Delanoë (P.). **Les diverses espèces de rats constatées dans les Doukkala et plus particulièrement à Mazagan. De la rareté du surmulot.** [The Species of Rats found in Doukkala, and particularly in Mazagan. The Rarity of the Norwegian Rat.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 584–589.

——. **Du nombre des mamelles chez le Rat d'Alexandrie.** *E. rattus* **var.** *alexandrinus* **G.** [The Number of Mammae in the Alexandria Rat, *E. rattus* var. *alexandrinus* G.]—*Bull. Soc. Path. Exot.* 1924. July. Vol. 17. No. 7. pp. 589–590.

Levaditi (C.), Nicolau (S.) & Schoen (R.). **L'étiologie de l'encéphalite épizootique du lapin, dans ses rapports avec l'étude expérimentale de l'encéphalite léthargique.** *Encephalitozoon cuniculi* **(nov. spec.).** [The Causation of Epizootic Encephalitis in the Rabbit and its bearing upon the Experimental Investigation of Lethargic Encephalitis. *Encephalitozoon cuniculi*, n.sp.]—*Ann. Inst. Pasteur.* 1924. Aug. Vol. 38. No. 8. pp. 651–712. With 2 plates & 18 text-figs.

Stassano (H.). **De la stérilisation des liquides en circulation continue, sous couche mince. Évolution de la méthode et transformation successive des appareils.** [The Sterilization of Liquids in their Layers, and the Evolution of the Method.]—*Ann. Inst. Pasteur.* 1924. May. Vol. 38. No. 5. pp. 427–448.

REPORTS.

Rhodesia, Northern. **Report of Chief Veterinary Officer for the Year ended March, 1924.** [MS. received through the Colonial Office.]

Rinderpest and foot and mouth disease are not known to exist. East Coast Fever, which has recently gained admittance, is confined to a district almost entirely surrounded by a fly belt. Pleuro-pneumonia has been eradicated from all parts with the exception of Barotseland.

The heaviest mortality is from anthrax. Very few districts are free from contagious bovine abortion. Headway is being made among European owned cattle in dealing with this disease. The policies of segregation and vaccination are both being tried. Many owners have used living vaccine on all female animals whether pregnant or not, and though a considerable number of pregnant animals aborted, the calf crops of the following year have been very good.

"Sweating sickness" in calves has been diagnosed for the first time. Cysticercus cellulosae is a very commonly occurring parasite of the pig and is of great economic importance. A disease termed tick pyaemia

is described as occurring in horses. It is characterized by the development of an abscess at the place where a bont tick has attached itself, this being followed by the development of abscesses all over the body. An attempt is being made to prepare an autogenous vaccine.

Horse sickness has been very prevalent.

Trypanosomiasis.—In using antimony tartrate for the treatment of trypanosomiasis the two Veterinary Officers in charge of the work use the posterior auricular vein in preference to the jugular for intravenous injections.

The results of treatment have varied. Sometimes improvement has been seen at once, at others it has been delayed. In a few cases death has followed the injections very promptly.

Abortion has been a not infrequent sequel to the injections.

Some animals appear to be antimony proof.

The Report contains a preliminary account of work done in connection with the so-called veld poisoning; as yet nothing very definite has emerged.

RHODESIA, SOUTHERN. **Report of the Chief Veterinary Surgeon for 1923.**—*Rhodesia Agric. Jl.* 1924. Aug. Vol. 21. No. 4. pp. 413–423.

The year was marked by an extensive spread of African Coast fever in the Charter District, and by a heavy mortality from horse sickness in all districts.

In connection with African Coast fever it is noted that when cattle are kept on infected veld and dipped every third day with the object of eradicating infection the mortality gradually decreases towards the end of the year, and invariably increases during the first few months of the following year. This is probably due to rains interfering with the efficacy of the dipping, but it does not appear to result in the dissemination of fresh infection, as in most cases mortality ceases within twelve months of the institution of three day dipping. Forty fresh centres of contagious abortion were discovered during the year. Vaccination with living or with " devitalized " vaccine was carried out in some cases, but no exact figures of the results are available. On one of the larger ranches 400 heifers were inoculated with live vaccine, and 3,000 with devitalized vaccine. The management reported no increase in the calf crop, nor did the vaccinated herds have a larger percentage of calves than the untreated.

RHODESIA, SOUTHERN. **Report of the Director of Veterinary Research for 1923.**—*Rhodesia Agric. Jl.* 1924. Aug. Vol. 21. No. 4. pp. 424–431.

The Director of Research calls attention to the criticism made elsewhere of the devitalized vaccine, and points out that in the absence of detailed information on many points, the vaccine cannot be condemned as a failure.

The death rate from horse sickness was about 34 per cent.

BOOK REVIEW.

REEKS (H. Caulton). [F.R.C.V.S.] **Diseases of the Horse's Foot.**—Second Edition. pp. xii+568. With 193 figs. 1925. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C. 2. [Price 21s.]

Nearly twenty years have elapsed since the first edition of this work appeared. It is a long interval, but it has been amply justified by the improved quality of the second edition, which is bound to enhance the reputation of the author for mature and reliable information on the diseases of the horse's foot. The anatomy and physiology of the foot, its conformation, method of examination, and the various operations that may be performed upon it are carefully described. A very full account is given of the diseases of the hoof-forming membrane, lateral cartilages, bones and joint of the foot, with all important details of treatment. In his observations the author is not dogmatic, and on points which are open to differences of opinion or of practice he is careful to state the published views of the better known authorities. Objection may be taken to the inclusion of so many reports of cases and their treatment, which in some instances appear to have no particular value, and of which at least one (p. 339) would seem to require further investigation.

J. Macqueen.